

CLAIMS:

1. A colour display device comprising:

a first display substrate and a second display

5 substrate, said substrates being spaced apart and opposed to each other;

a layer of an electro-optic material between the substrates;

10 a set of elongate parallel first electrodes on an inner surface of the first display substrate and a set of elongate parallel second electrodes on an inner surface of the second display substrate, said second electrodes being aligned substantially orthogonally to said first electrodes;

15 said first electrodes overlapping said second electrodes to define pixels for selectively applying an electric field across at least some of said electro-optic material;

20 a set of first colour filters on the first display substrate, each of said first colour filters being in register with one of said first electrodes, wherein each of said first colour filters is of substantially the same size and shape as the electrode with which it is registered;

25 a set of second colour filters on the second display substrate, each of said second colour filters being in register with one of said second electrodes, wherein each of said second colour filters is of substantially the same size and shape as the electrode with which it is registered;

30 whereby the colour of light transmitted through a pixel is determined by the light transmitted by both the first colour filter and the second colour filter that overlap at that pixel.

2. A device according to claim 1, wherein said first colour filters comprise at least two different colours selected from

cyan, magenta and yellow, and wherein said second colour filters comprise at least two different colours selected from cyan, magenta and yellow and selected so that any two-by-two array of pixels contains at least one red, one green and one  
5 blue pixel.

3. A device according to claim 1 or claim 2, wherein said first colour filters comprise alternating stripes of yellow and cyan and wherein said second colour filters comprise  
10 alternating stripes of yellow and magenta.

4. A device according to claim 1 or claim 2, wherein said first and second colour filters each comprise repeating stripes of cyan, magenta and yellow.  
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5. A device according to claim 1, wherein said first and second colour filters each comprise stripes of a plurality of colours, and wherein the wavelengths of light transmitted by all of said first colour filters or by all of said second  
20 colour filters would if mixed produce substantially white light.

6. A device according to any preceding claim, further including a backlight for illuminating the display, located  
25 adjacent to an outer surface of said second display substrate; wherein said second colour filters comprise reflectance filters so that at least some of the light which is not transmitted by said second colour filters will be reflected towards said backlight.

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7. A device according to claim 6, wherein said first colour filters comprise absorbing filters, whereby incident light which is not transmitted by said first colour filters will be

substantially absorbed by said filters.

8. A device according to any preceding claim, wherein each electrode is provided with an associated busbar with which it  
5 is in registration and in electrical contact.

9. A device according to any preceding claim, wherein the electro-optic material is a liquid crystal material.

10 10. A method of manufacturing a colour display device, comprising the steps of:

taking a first display substrate having a set of elongate parallel first electrodes on a surface thereof, each of said first electrodes being in register with a colour  
15 filter and a busbar provided on the first display substrate;

taking a second display substrate having a set of elongate parallel second electrodes on a surface thereof, each of said second electrodes being in register with a colour filter and a busbar provided on the second display  
20 substrate;

wherein each of said colour filters is of substantially the same size and shape as the electrode with which it is registered;

arranging said first and second display substrates in  
25 opposition with the surfaces carrying the electrodes facing inwards and spaced apart, and with the first electrodes aligned substantially orthogonally to the second electrodes to define pixels in regions of overlap for selectively applying an electric field therebetween; and

30 filling the space between the substrates with an electro-optic material and forming a peripheral seal to retain the electro-optic material;

whereby the colour of light transmitted through a pixel

will be determined by the light transmitted by both the first colour filter and the second colour filter that overlap at that pixel.

- 5 11. A method according to claim 10, further comprising the step of forming the first display substrate by:

forming said colour filters and said busbars in registration on a surface of a transfer carrier;

- 10 adhering said colour filters and said busbars to a sheet of a translucent glass or plastics material;

removing said transfer carrier;

- forming a translucent conductor layer on said busbars after removal of said transfer carrier, said translucent conductor layer being capable of being rendered substantially non-conductive after exposure to UV light of sufficient intensity and duration;

- 15 illuminating said conductor layer with UV light of sufficient intensity and duration through said sheet so as to cause substantial loss of conductivity in regions of said conductor layer corresponding to spaces between said colour filters;

- 20 thereby forming a plurality of translucent electrode tracks, each of which is in electrical contact with a busbar.

- 25 12. A method according to claim 10, further comprising the step of forming the first display substrate by:

forming said colour filters and said busbars in registration on a surface of a transfer carrier;

- 30 adhering said colour filters and said busbars to a sheet of a translucent glass or plastics material;

removing said transfer carrier;

forming a transparent conductor layer on said busbars after removal of said transfer carrier;

applying a layer of positive photoresist material to said conductor layer;

illuminating said photoresist material with UV light of sufficient intensity and duration through said display substrate as to effect a chemical change in exposed regions of said photoresist material corresponding to spaces between said light filters;

developing said photoresist so as to remove said photoresist in said exposed regions;

10 etching said conductor layer in regions where said photoresist has been removed, thereby forming a plurality of transparent electrode tracks, each of which is in electrical contact with a busbar; and

removing remaining photoresist.

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13. A method according to claim 12, wherein said surface of said transfer carrier is planar.

14. A colour display device comprising first and second spaced apart display substrates enclosing a layer of an electro-optic material, an inner surface of each substrate being provided with a plurality of elongate parallel electrodes and a plurality of elongate parallel colour filters, each filter being in register with an electrode and each filter being of substantially the same size and shape as the electrode with which it is in register; wherein the electrodes on one of the inner surfaces are aligned substantially orthogonally to those on the other inner surface so that the colour of light transmitted through a location where two colour filters overlap is determined by the light transmitted by both of the filters.

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15. A colour liquid crystal display device comprising:

first and second spaced apart display substrates enclosing a layer of a liquid crystal material, an inner surface of each substrate being provided with a plurality of elongate parallel electrodes each of which is in register  
5 with an elongate colour filter of substantially the same size and shape as the electrode with which it is registered and is provided on the same substrate;

the electrodes on one of the inner surfaces being aligned substantially orthogonally to those on the other  
10 inner surface so that the colour of light transmitted through a location where two colour filters overlap is determined by the light transmitted by both of the filters;

the device including a backlight located adjacent to an outer surface of the second display substrate, and the colour  
15 filters on the second display substrate being reflective colour filters.

16. A device according to claim 15, wherein the colour filters on the first display substrate are absorptive colour  
20 filters.